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(54) COMPOSITE MATERIALS AND MODIFIED FIBRES

(71) We, KJELD HOLBEK, a Danish subject of Lejrevej 74, DK-4320 Lejre, Denmark; do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

5 This invention relates to composite materials and modified fibres; more particularly, it relates to composite materials comprising certain cellulose-containing fibres which are impregnated, preferably by a vacuum and/or pressure impregnation technique, with at least one wood preservation agent in the fibre structure. Such cellulose-containing fibres and composite materials have novel properties and novel fields of application.

10 The present invention provides a composite material which comprises cellulose-containing fibres selected from sulphate pulp fibres, sulphite pulp fibres, semi-chemical pulp fibres, chemi-mechanical pulp fibres, thermo-mechanical pulp fibres and mechanical pulp fibres, or waste paper or waste cardboard fibres or fibre bundles, saw dust, wood chip, shavings, wood wool or synthetic cellulose fibres which are impregnated with at least one agent selected from silicon and metal oxide acylates and biocidally-active metal compounds comprising a metal selected from copper, mercury, chromium, tin and zinc, and a binder.

15 The present invention also provides such cellulose-containing fibres which are impregnated with a silicon or metal oxide acylate. Such fibres may be produced by a process which comprises impregnating the cellulose-containing fibres with at least one such agent by a vacuum and/or pressure impregnation technique.

20 The impregnation may involve an initial evaporation stage, followed by application of the impregnation agent at normal pressure or at super-atmospheric pressure. The agent may be applied dissolved in a low-boiling organic solvent at a temperature immediately below the boiling point of the solvent. The fibres may be in the form of sheets, rolls or bales which are defibrated immediately subsequent to the impregnation.

25 The cellulose-containing fibres are, e.g. pulp fibres, such as sulphate pulp fibres, sulphite pulp fibres, semi-chemical pulp fibres, chemi-mechanical pulp fibres, thermo-mechanical pulp fibres and mechanical pulp fibres, for example prepared from soft wood or hard wood, straw or bark. The pulp may be bleached, or unbleached. The pulp fibres may be in the form of, for example, discrete fibres (wet or dry), sheets, rolls, granulates, bales. Important cellulose-containing fibres for the present purposes are waste fibres, for example waste paper or waste cardboard. However, it is also within the scope of the present invention that the cellulose-containing fibres are fibre bundles, saw dust, wood chip, shavings, wood wool or synthetic cellulose fibres. The cellulose-containing fibres are characterized in that they are impregnated with at least one wood preservation agent.

35 The impregnation for the production of the fibres may be carried out according to known methods of vacuum and/or pressure impregnation, e.g. impregnation by pressure, in which the impregnating agent is introduced into the material by applying an external pressure, or vacuum impregnation, in which the fibres to be impregnated are first subjected to a vacuum, whereafter the impregnating agent is introduced into the material by releasing the vacuum and optionally applying super-atmospheric pressure. It is also possible to apply alternating pressure-vacuum steps so as to "pump" the impregnating agent through the material.

40 Depending upon the solubility characteristics of the impregnation agent, the impregnation may also be performed by using the method wherein impregnation is performed using
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